

Author Reflexivity Statement

1. How does this study address local research and policy priorities?

Indoor residual spraying (IRS) along with insecticide-treated bed nets (ITNs) are foundational interventions of malaria control and elimination in Madagascar. Targeting non-pyrethroid IRS campaigns to complement pyrethroid ITNs is a priority outlined in the 2018-2022 Malaria National Strategic Plan of the Madagascar National Malaria Control Program (NMCP). This work directly responds to questions around effectiveness and impact of IRS campaigns carried out during the study period from 2016 to 2021.

2. How were local researchers involved in study design?

The research questions that guided this work were defined by the co-authors who were staff of the Madagascar NMCP (SR, HR, and CR), and they were closely involved in developing the modelling strategy employed in the study. HR and SR have experience working directly with IRS campaign operations in Madagascar, and their insights into operational realities guided analytic decisions around IRS campaign and routine data.

3. How has funding been used to support the local research team?

The PMI VectorLink project funds the position of TG and other staff in Madagascar. The NMCP co-authors are funded through their regular employment, and do not require funding through this study.

4. How are research staff who conducted data collection acknowledged?

There was no primary data collection conducted for this study. Health workers in Madagascar who reported the HMIS data used are included in the acknowledgements.

5. Do all members of the research partnership have access to study data?

All members of the partnership have access to the raw and cleaned study datasets as well as the final coding scripts used for modeling.

6. How was data used to develop analytical skills within the partnership?

JR and SB provided guidance to EH on the analysis; EH worked with SR and HR to adjust the analysis according to their expertise on the intervention and data sources. Approximately monthly meetings were held with SR and HR during the data analysis phase and initial production of results. These meetings were used to interpret preliminary results and make analytic adjustments accordingly. All authors were involved in the analytical interpretation of the data.

7. How have research partners collaborated in interpreting study data?

HR, SR, JB, SB, DJ, and TG were involved in interpretation of preliminary data analysis through discussions and presentations. All co-authors reviewed and commented on preliminary results.

8. How were research partners supported to develop writing skills?

EH was supported by more senior members of the team to develop and refine their writing skills.

9. How will research products be shared to address local needs?

This paper will be published in an open-access journal, making it accessible to local and global researchers, and the final version will be translated into French and posted on an open access server for review by francophone readers. It is also available on a pre-print server to facilitate early sharing of the results for decision-makers. This work was presented by poster by EH and SR at the American Society of Tropical Medicine and Hygiene (ASTMH) conference in November 2022 in English and French. Additionally, the results of this work have already been shared with the Madagascar NMCP to inform their future strategic planning.

10. How is the leadership, contribution and ownership of this work by LMIC researchers recognized within the authorship?

Authors SR and HR were key to the design of this study and contributed to the analysis and interpretation of results. This has been recognized by placing them as second and third authors. As the chief of the Madagascar NMCP, CR is the senior author listed last on this paper. Also included among the LMIC authors is TG who leads the VectorLink project in Madagascar.

11. How have early career researchers across the partnership been included within the authorship team?

There were no early career researchers involved in this study.

12. How has gender balance been addressed within the authorship?

Eight authors are female (EH, SR, JR, AB, SZ, CD, DJ, and SB) and four authors are male (HR, LK, TG, CR).

13. How has the project contributed to training of LMIC researchers?

The authorship team is primarily composed of senior researchers. Most of the authors from LMIC are senior researchers. HR is a mid-career researcher from Madagascar who was directly involved in the design, analysis, and interpretation of this study.

14. How has the project contributed to improvements in local infrastructure?

This study has not directly contributed to improvements in local infrastructure.

15. What safeguarding procedures were used to protect local study participants and researchers?

There was no primary data collection as part of this study, therefore this question is not applicable to this manuscript.